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TI-25320

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Park et al
Serial No.:	09/173,129
Filing Date:	October 15, 1998 (original) May 10, 1998 (CPA)
Group Art Unit:	2814
Examiner:	Peralta, Ginette
Title:	SELECTIVE OXIDATION FOR SEMICONDUCTOR DEVICE FABRICATION

Honorable Commissioner of
Patent and Trademarks
Washington, D.C. 20231

Dear Sir:

DECLARATION UNDER RULE 132

1. I, Boyang Lin, have graduated from Princeton University with a masters degree and a Ph.D in electrical engineering. My master degree in electrical engineer has a minor in physics. I am currently a process engineer for Texas Instruments Incorporated of Dallas, Texas. In addition, I have worked in the field of chemical reactions for material deposition for over ten years.

2. From studies and from experience, I am very knowledgeable about reactions between hydrogen (H_2) and oxygen (O_2).

3. I have reviewed the U.S. Pat. No. 5,907,188 to Nakajima et al, in particular the passage at column 6, lines 34-55 cited by the Examiner. This patent cites the use of N_2, H_2 and O_2, with the partial pressure of hydrogen being less than 4% at a body temperature at 600 degrees Centigrade. It is well known in the industry that his combination is not explosive. In fact, the Nakajima reference specifically states that the "H_2 gas can be treated in the same manner as an inert gas" since the H_2 gas is set at a partial pressure below the "explosion limit" (column 6, lines 49-54).

4. By contrast, the present application deals with reactions with the partial pressure of the hydrogen gas at 100%, which is above the explosion limit. The present application

introduces techniques for making the ensuing explosive reaction safe for the equipment. Nakajima makes no mention of combining H_2 with an oxygen-containing gas in a reaction above the explosion limit.

5. The present application provides support for combining H_2 with O_2 (or with another oxygen containing gas) in a reaction above the explosion limit. The specification discusses selective oxidation using a reaction between O_2 and H_2 (as well as other embodiments of oxygen-containing gases and hydrogen-containing gases) without an additional inert gas such as N_2. For example, on page 7, a constant volume mix of O_2 and H_2 in a ratio of 1:10 are reacted at an initial pressure of 200 Torr. On page 8 (last paragraph), 12% O_2 and H_2 are introduced into the chamber. On page 11, an O_2/H_2 mixture of 20% is described. In all of these examples, the reaction is explosive in contrast to Nakajima's approach which introduces a large amount of non-reactive gas together with H_2 (<4%) to keep the reaction below the explosive limit (see Nakajima, col.6, lines 24-55).

6. In the present application, the partial pressure of the hydrogen gas (100%) is well above the explosion limit (4%), well known in the industry, and by the 4% limit set by the Nakajima reference (see Nakajima, col.6, lines 24-55).

7. I therefore submit that the present specification describes selective oxidization of a semiconductor using an explosive reaction between O_2 and H_2. The specification states several techniques for controlling the explosive reaction for safe processing. The Nakajima reference describes a reaction between O_2 and H_2 only where an inert gas such as nitrogen is provided such that the partial pressure of H_2 remains below the explosion limit.

8. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such a willful false statement may jeopardize the validity of the application or any patent issued thereon.

Date: 7/24/2002

Boyang Lin